Appendix A: Functions Within a Sampling Project

The following table describes Quality Assurance Project Plan (QAPP) requirements taken from *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5.

Functions Within a Sampling Project	Elements of that Function
Project Management	
Project/Task Organization	Identifies the individuals or organizations participating in the project and defines their specific roles and responsibilities.
Problem Definition/Background	States the specific problem to be solved or decision to be made and includes sufficient background information to provide a historical and scientific perspective for each particular project.
Project/Task Description	Describes the work to be performed and the schedule for implementation to include: • Measurements to be made during the course of the project; • Applicable technical, regulatory, or program-specific quality standards, criteria, or objectives; • Any special personnel and equipment requirements; assessment tools needed; and • A work schedule and any required project and quality records, including types of reports needed.
Quality Objectives and Criteria	Describes the project quality objectives and measurement performance criteria.
Special Training/Certification	Ensures that any specialized training for non-routine field sampling techniques, field analyses, laboratory analyses, or data validation should be specified.
Documents and Records	• Itemizes the information and records that must be included in the data report package and specifies the desired reporting format for hard copy and electronic forms, when used. • Identifies any other records and documents applicable to the project such as audit reports, interim progress reports, and final reports that will be produced. • Specifies or references all applicable requirements for the final disposition of records and documents, including location and length of retention period.
Data Generation and Acquisition	
Sampling Process Design (Experimental Design)	• Describes the experimental design or data collection design for the project. • Classifies all measurements as critical or non-critical.

Functions Within a Sampling Project	Elements of that Function
Sampling Methods	• Describes the procedures for collecting samples and identifies sampling methods and equipment. Includes any implementation requirements, support facilities, sample preservation requirements, and materials needed. • Describes the process for preparing and decontaminating sampling equipment to include the disposal of decontamination by-products, selection and preparation of sample containers, sample volumes, preservation methods, and maximum holding times for sampling, preparation, and/or analysis. • Describes specific performance requirements for the method. • Addresses what to do when a failure in sampling occurs, who is responsible for corrective action, and how the effectiveness of the corrective action shall be determined and documented.
Sample Handling and Custody	• Describes the requirements and provisions for sample handling and custody in the field, laboratory, and transport, taking into account the nature of the samples, the maximum allowable sample holding times before extraction and analysis, and the available shipping options and schedules. • Includes examples of sample labels, custody forms, and sample custody logs.
Analytical Methods	• Identifies the analytical methods and equipment required, including sub-sampling or extraction methods, waste disposal requirements (if any), and specific method performance requirements. • Identifies analytical methods by number, date, and regulatory citation (as appropriate). If a method allows the user to select from various options, the method citations should state exactly which options are being selected. • Addresses what to do when a failure in the analytical system occurs, who is responsible for corrective action, and how the effectiveness of the corrective action shall be determined and documented. • Specifies the laboratory turnaround time needed, if important to the project schedule. • Specifies whether a field sampling and/or laboratory analysis Case Narrative is required to provide a complete description of any difficulties encountered during sampling or analysis.
Quality Control (QC)	• Identifies required measurement Quality Control (QC) checks for both the field and laboratory. • States the frequency of analysis for each type of QC check, and the spike compounds sources and levels. • States or references the required control limits for each QC check and corrective action required when control limits are exceeded and how the effectiveness of the corrective action shall be determined and documented. • Describes or references the procedures to be used to calculate each of the QC statistics.

Functions Within a Sampling Project	Elements of that Function
Instrument/Equipment Testing, Inspection, and Maintenance	• Describes how inspections and acceptance testing of environmental sampling and measurement systems and their components will be performed and documented. Identifies and discusses the procedure by which final acceptance will be performed by independent personnel. • Describes how deficiencies are to be resolved and when re-inspection will be performed. • Describes or references how periodic preventative and corrective maintenance of measurement or test equipment shall be performed. • Identifies the equipment and/or system requiring periodic maintenance. • Discusses how the availability of spare parts, identified in the operating guidance and/or design specifications of the systems will be assured and maintained.
Instrument/Equipment Calibration and Frequency	• Identifies all tools, gauges, instruments, and other sampling, measuring, and test equipment used for data collection activities affecting quality that must be controlled, and at specific times, calibrated to maintain performance within specified limits. • Identifies the certified equipment and/or standards used for calibration. • Describes or references how calibration will be conducted using certified equipment and/or standards with known valid relationships to nationally recognized performance standards. If no such standards exists, documents the basis for calibration. • Indicates how records of calibration shall be maintained and traceable to the instrument.
Inspection/Acceptance of Supplies and Consumables	• Describes how and by whom supplies and consumables shall be inspected and accepted for use in the project. • States acceptance criteria for such supplies and consumables.
Non-direct Measurements	• Identifies any types of data needed for project implementation or decision-making that are obtained from non-measurement sources (e.g., computer databases, programs, literature files, historical databases). • Describes the intended use of data. • Defines the acceptance criteria for the use of such data in the project. • Specifies any limitations on the use of the data.
Data Management	• Describes the project data management scheme, tracing the data path from generation in the field or laboratory to their final use or storage. • Describes or references the standard record-keeping procedures, document control system, and the approach used for data storage and retrieval on electronic media.

Appendix B: CLP Sample Collection Guidelines for Volatile Organic Analytes (VOAs) in Soil by SW-846 Method 5035A

A. Preferred Options for the Contract Laboratory Program (CLP) are Options 1, 2, and 3:

Note: Samples to be frozen must be placed on their sides prior to being frozen.

Option 1. Closed-system Vials:
Container - tared or preweighed 40 mL VOA Vials containing a magnetic stir bar.

Collect 5 g of soil per vial (iced or frozen in the field).

Regular Samples	3 Vials - Dry (5 g soil per vial) 1 Vial - Dry (filled with soil, no headspace) 4 Total Vials
Regular Samples Requiring QC Analysis	11 Vials - Dry (5 g soil per vial) 1 Vial - Dry (filled with soil, no headspace) 12 Total Vials

Option 2. Closed-system Vials Containing Water:
Container - tared or pre-weighed 40 mL VOA vials containing a magnetic stir bar and 5 mL water.

Collect 5 g of soil per vial (iced or frozen in the field).

Regular Samples	2 Vials with water added (5 g soil and 5 mL water per vial) 1 Vial - Dry (5 g soil in vial) 1 Vial - Dry (filled with soil, no headspace) 4 Total Vials (2 with water and 2 dry)
Regular Samples Requiring QC Analysis	6 Vials with water added (5 g soil and 5 mL water per vial) 5 Vials - Dry (5 g soil per vial) 1 Vial - Dry (filled with soil, no headspace) 12 Total Vials (6 with water and 6 dry)

Option 3. Coring Tool used as a Tranport Device (e.g., EnCore™ Coring Device):
Container - EnCore 5 g Samplers or equivalent.

Note: All Samplers should be iced or frozen in the field and bagged individually.

Regular Samples	3 Samplers (5 g soil per Sampler) 1 Vial - Dry (filled with soil, no headspace) 4 Total (3 Samplers and 1 Vial)

Regular Samples	11 Samplers (5 g soil per Sampler)
Requiring QC Analysis	1 Vial - Dry (filled with soil, no headspace)
	12 Total (11 Samplers and 1 Vial)

B. Options 4, 5 and 6 are NOT Preferred Options for the CLP:

Option 4. Closed-system Vials:
Container - tared or preweighed 40 mL VOA Vials containing a magnetic stir bar and preservative.

Collect 5 g of soil per vial and add $NaHSO_4$ Preservative (5 mL water + 1 g $NaHSO_4$) - iced or frozen in the field.

Caution - This option is NOT a Preferred Option for the CLP because:

Sodium bisulfate ($NaHSO_4$) preservation creates low pH conditions that will cause the destruction of certain CLP target analytes (e.g., vinyl chloride, trichloroethene, trichlorofluoromethane, cis- and trans-1,3-dichloropropene). Projects requiring the quantitation of these analytes should consider alternative sample preservation methods. $NaHSO_4$ also cannot be used on carbonaceous soils. Check the soil before using this method of collection! Soil can be checked by placing a test sample in a clean vial, then adding several drops of $NaHSO_4$ solution. If the soil bubbles, use Option 4b and note this problem on the TR/COC Record.

Option 4a. Samples preserved in the field ($NaHSO_4$ preservative added in the field)

Regular Samples	2 Vials with $NaHSO_4$ preservative added (5g soil per vial)
	1 Vial without $NaHSO_4$ preservative added (5g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	4 Vials Total (2 with $NaHSO_4$ preservative and 2 without)

Regular Samples	6 Vials with $NaHSO_4$ preservative added (5g soil per vial)
Requiring QC Analyses	5 Vials without $NaHSO_4$ preservative added (5 g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	12 Total Vials (6 with $NaHSO_4$ and 6 without)

Option 4b. Samples are preserved by the laboratory (No $NaHSO_4$ preservative is added to these samples in the field).

Regular Samples	3 Vials - Dry (5 g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	4 Total Vials

Regular Samples	11 Vials - Dry (5 g soil per vial)
Requiring QC Analyses	1 Vial - Dry (filled with soil, no headspace)
	12 Total Vials

Option 5. Methanol Preservation (medium-level analysis only):
Container - tared or pre-weighed 40 mL VOA vials containing 5-10 mL Methanol.

Collect 5 g of soil per vial (iced in the field).

Caution - This option is NOT a preferred option for the CLP because:

Samples preserved with Methanol can only be analyzed by the medium-level method. Low-level CRQLs cannot be achieved when samples are preserved this way.

Additional problems associated with use of Methanol as a preservative in the field include:

- Possible contamination of the Methanol by sampling-related activities (e.g., absorption of diesel fumes from sampling equipment);
- Leakage of Methanol from the sample vials during shipping, resulting in loss of VOAs prior to analysis.

Regular Samples	2 Vials (5 g soil and 5-10 mL Methanol per vial) 1 Vial - Dry (filled with soil, no headspace) 3 Total Vials (2 with Methanol and 1 dry)
Regular Samples Requiring QC Analysis	6 Vials (5 g soil and 5-10 mL Methanol per vial) 1 Vial -Dry (filled with soil, no headspace) 7 Total Vials (6 with Methanol and 1 dry)

Note: If shipping samples containing Methanol as a preservative, a label must be used to indicate Methanol. This label must also contain the United Nations (UN) identification number for Methanol (UN 1230), and indicate Limited Quantity.

Option 6. Glass Containers filled with sample - No Headspace:
Container - 4 oz Glass Jars.

Glass container filled with soil with no headspace.

Caution - This option is NOT a Preferred Option for CLP because:

Samples collected in this manner lose most of their volatile analytes prior to analysis when the sample containers are opened and subsampled in the laboratory. This option is only present due to Regional requirements.

Regular Samples	2 Glass Jars (4 oz) filled with sample, no headspace 1 Vial- Dry (filled with soil, no headspace) 3 Total Containers
Regular Samples Requiring QC Analysis	2 Glass Jars (4 oz) filled with sample, no headspace 1 Vial - Dry (filled with soil, no headspace) 3 Total Containers

C. Caution:

1. Extreme care must be taken to ensure that frozen samples do not break during shipment.

2. Before adding soil to pre-weighed vials containing a stir bar, weigh the vials to confirm the *tared weight*. If the weight varies by more than 0.1 g, record the new weight on the label and the sample documentation. Do NOT add labels to these vials once the tared weight has been determined/confirmed.

D. Dry Samples:

All options include taking a sample in a dry 40 mL VOA vial (or a 4 oz wide mouth jar) with no headspace. No additional water, $NaHSO_4$, or Methanol is added to this sample. This sample is taken to determine moisture content, therefore they do not need to be tared or have a stir bar.

E. Iced or Frozen Samples:

1. **Iced** means cooled to 4°C (±2°C) immediately after collection.

2. **Frozen** means cooled to between ⁻7°C and ⁻15°C immediately after collection.

F. Sample Delivery:

CLP strongly recommends that all samples reach the laboratory by COB the next day after sample collection.

G. Notes:

1. For Option 4, samples can be preserved with $NaHSO_4$ either:

   - In the field; or

   - In the laboratory upon receipt. In this case, the sampler should put the following information in the Preservation Column of the TR/COC Record - "To be preserved at lab with NaHSO4". This Regional Request should also be communicated to SMO so that the laboratory can be notified.

2. Regional QAPPs may require the use of Option 5. Please note that this option is for medium-level analysis ONLY.

3. If water, Methanol, or $NaHSO_4$ preservative is added to the vials in the field, a field blank using the appropriate addition used in the vials should be sent to the laboratory for analysis.

H. Number of Containers Rationale:

The rationale for the number of containers (vials or samplers) required for the field sample and the required laboratory QC for each option is given as follows:

Option 1.

Rationale for Regular Vials:	1 vial for low-level analysis (water purge) 1 vial for backup low-level analysis 1 vial for medium-level analysis (Methanol extraction)
Rationale for QC Vials:	2 vials for MS and MSD low-level analysis 2 vials for backup MS and MSD low-level analysis 2 vials for MS and MSD medium-level analysis 2 vials for backup MS and MSD medium-level analysis

Option 2.

Rationale for Regular Vials:	1 vial for low-level analysis (water purge) 1 vial for back up low-level analysis 1 vial dry for medium-level analysis (Methanol extraction)
Rationale for QC Vials:	2 vials for MS and MSD low-level analysis 2 vials for backup MS and MSD low-level analysis 2 vials dry for MS and MSD medium-level analysis 2 vials dry for backup MS and MSD medium-level analysis
Medium-level Analysis:	Methanol will be added in the laboratory

Option 3.

Rationale for Regular Samples:	1 sampler for low-level analysis (water purge) 1 sampler for back up low-level analysis 1 sampler for medium-level analysis (Methanol extraction)
Rationale for QC Samples:	2 samplers for MS and MSD low-level analysis 2 samplers for backup MS and MSD low-level analysis 2 samplers for MS and MSD medium-level analysis 2 samplers for backup MS and MSD medium-level analysis

Option 4a.

Rationale for Regular Vials:	1 vial with water for low-level analysis (water purge) 1 vial with water for backup low-level analysis 1 vial dry for medium-level analysis (Methanol extraction)
Rationale for QC Vials:	2 vials with water for MS and MSD low-level analysis 2 vials with water for backup MS and MSD low-level analysis 2 vials dry for MS and MSD medium-level analysis 2 vials dry for backup MS and MSD medium-level analysis

Option 4b.

Rationale for Regular Vials:	1 vial for low-level analysis (water purge) 1 vial for backup low-level analysis 1 vial for medium-level analysis (Methanol extraction)
Rationale for QC Vials:	2 vials for MS and MSD low-level analysis 2 vials for backup MS and MSD low-level analysis 2 vials for MS and MSD medium-level analysis 2 vials for backup MS and MSD medium-level analysis

Option 5.

Rationale for Regular Samples:	1 vial for regular medium-level analysis 1 vial for back up medium-level analysis
Rationale for QC Samples:	2 samples for MS and MSD 2 samples for backup MS and MSD

Option 6.

In this option all Regular and QC samples for both low-level and medium analysis are taken as subsamples from the same container.

Rationale for Regular Samples and Regular Samples Requiring QC Analysis:	1 glass jar for low-level analysis and medium-level analysis of the sample, MS, and MSD 1 glass jar for back up low-level analysis and medium-level analysis of the sample, MS, and MSD

Abbreviations Used Within this Appendix:

CLP	Contract Laboratory Program
COB	Close of Business
CRQL	Contract Required Quantitation Limit
QAPP	Quality Assurance Project Plan
QC	Quality Control
MS	Matrix Spike
MSD	Matrix Spike Duplicate
$NaHSO_4$	Sodium Bisulfate
SMO	Sample Management Office
TR/COC	Traffic Report/Chain of Custody
VOA	Volatile Organic Analyte

Appendix C: General CLP Sample Collection Guidelines Volatile Organic Analytes (VOAs) in Water

Note: Please note that Regional guidance and/or specific Project Plan requirements will supersede the guidelines listed below.

Collect the following:

At least two 40 mL glass containers with Polytetrafluoroethylene (PTFE)-lined septa and open top screw-caps that are filled to capacity with no air bubbles, preserved to a pH of 2 with HCl, and cooled to 4°C (±2°C) immediately after collection. DO NOT FREEZE THE SAMPLES.

If Selected Ion Monitoring (SIM) analysis is requested, at least two additional 40 mL glass containers with Polytetrafluoroethylene (PTFE)-lined septa and open top screw-caps that are filled to capacity with no air bubbles, preserved to a pH of 2 with HCl, and cooled to 4°C (±2°C) immediately after collection.

Carbonates, Residual Chlorine, Oxidants, and Sulfides:

It is very important that samplers obtain Regional guidance when testing and ameliorating for:

- Carbonates;
- Residual chlorine (e.g., municipal waters or industrial waste waters that are treated with chlorine prior to use or discharge); or
- Oxidants.

VOA samples containing carbonates react with the acid preservative causing effervescence (due to formation of carbon dioxide), which can cause loss of volatile analytes.

Residual chlorine present in VOA samples can continue to react with dissolved organic matter. This continuous reaction may lead to inaccurate quantitation of certain analytes present in the sample at the time of collection.

Residual chlorine and oxidants present in VOA samples can cause degradation of certain volatile analytes (e.g., styrene).

Perform the following for *Pre-Preserved* Vials:

1. Pour the sample slowly down the edge of the sample vial to avoid excess aeration or agitation of the sample during filling.

2. Fill the vial completely so that a reverse (convex) meniscus is present and ensure that there are no air bubbles present (either in the body or especially at the top of the vial).

3. Place the septum on the vial so that the PTFE side is in contact with the sample, then firmly tighten the cap.

4. Gently flip the vial a few times to ensure that the sample is mixed with the acid preservative.

5. While holding the vial upright, gently tap the sample to check for air bubbles (either in the body or especially at the top of the vial).

6. If air bubbles are present, discard the sample and select a new vial in which to recollect a new sample. Repeat Steps 1-5 above.

7. Do NOT mix or composite samples for VOAs.

8. Cool sample to a temperature of 4°C (±2°C). Samplers should begin the cooling process in the field as samples are being collected. Double-bagged ice should be used. DO **NOT** FREEZE SAMPLES.

9. Immediately transfer the vial to the sample shuttle (device that contains a "set" of VOA vials) once it has been collected. Do NOT allow ice to touch the vials.

Perform the Following for *Empty* Vials:

1. Rinse the vial with sample water prior to actual sample collection and preservation.

   Note: Regions vary in their approach to pre-rinsing and/or re-using sample vials (e.g., some Regions do not recommend pre-rinsing and/or re-use of pre-cleaned containers using sample water). Be sure to follow Regional guidance.

2. Add 1-2 mL of acid preservative to the vial. **Check to ensure that the sample you are collecting requires a preservative** (follow Regional guidance).

3. Pouring the sample slowly down the edge of the sample vial to avoid excess aeration and agitation of the sample.

4. Fill the vial completely so that a reverse (convex) meniscus is present and ensure that there are no air bubbles present (either in the body or especially at the top of the vial).

5. Place the septum on the vial so that the PTFE side is in contact with the sample, then firmly tighten the cap.

6. Gently flip the vial a few times to ensure that the sample is mixed with the acid preservative.

7. While holding the vial upright, gently tap the vial to check for air bubbles (either in the body or especially at the top of the vial).

8. If air bubbles are present, discard the sample and recollect a new sample using the same sample vial. Repeat Steps 1-6 above.

9. Check the recollected sample for air bubbles. If air bubbles are present, additional sample water may be added to the vial to eliminate air bubbles. If there are air bubbles after three consecutive attempts to eliminate air bubbles by the addition of sample water, the entire sample and sample vial should be discarded and a new sample collected.

10. Do NOT mix or composite samples for VOAs.

11. Cool sample to a temperature of 4°C (±2°C). Samplers should begin the cooling process in the

field as samples are being collected. Double-bagged ice should be used. DO **NOT** FREEZE SAMPLES.

12. Immediately transfer the vial to the sample shuttle (device which contains a "set" of VOA vials) once it has been collected. Do NOT allow ice to touch the vials.

Things to Remember:

- Samples **must** be shipped as soon as possible, preferably on the same day as sample collection to avoid exceeding sample holding times. If overnight transit is not possible, samples should be maintained at 2 - 4°C until they are shipped to the laboratory.

- If samples are not preserved (a requirement for certain analytes), the technical holding time is shortened to 7 days.

Appendix D: Sampling Techniques and Considerations

When performing a sampling event, the sampler is expected to follow prescribed sampling techniques. The sampler should also be aware of any special sampling considerations, contaminant issues, and sample compositing and mixing methods that could affect their sampling efforts.

Disclaimer: Regional guidance will take precedence over any of the techniques and considerations listed below.

D.1 General Sampling Techniques

This section provides information on guidance documents available for collecting samples. Information regarding surface water, sediment, soil, and groundwater sampling can be found in many documents including, but not limited to, the following sources:

- *Compendium of ERT Surface Water and Sediment Sampling Procedures*, EPA/540/P-91/005;
- *Compendium of ERT Soil Sampling and Surface Geophysics Procedures*, EPA/540/P-91/006;
- *Compendium of ERT Groundwater Sampling Procedures*, EPA/540/P-91/007;
- Quality Assurance Sampling Plan for Environmental Response (QASPER) software, Version 4.1, ERT; and
- *Requirements for the Preparation of Sampling and Analysis Plans*, United States Army Corps of Engineers, February 1, 2001, EM 200-1-3.

When working with potentially hazardous materials, samplers should follow USEPA and Occupational Safety & Health Administration (OSHA) requirements, specific health and safety procedures, and Department of Transportation (DOT) requirements.

D.2 Special Sampling Considerations

The following sections provides general guidance for volatile, low concentration contaminant, duplicate, and split sample collection, along with procedures for compositing and mixing. The guidance provided in these sections may be useful and appropriate for the collection of Contract Laboratory Program (CLP) Routine Analytical Services (RAS) samples.

Samplers should refer to Regionally-developed Standard Operating Procedures (SOPs) to obtain specific procedures for properly collecting and preserving samples in the field. For additional guidance regarding sampling for volatile organic analytes (VOAs) in soil and water, see Appendices B and C.

Samplers should obtain Regional guidance when testing and ameliorating for:

- Carbonates in VOA soil and water;
- Residual chlorine in VOA soil and water, or cyanide water;
- Oxidants in VOA soil and water; or
- Sulfides in cyanide.

D.3 Contaminant Sampling

Certain compounds can be detected in the parts-per-billion (ppb) and/or parts-per-trillion (ppt) range. Extreme care MUST be taken to prevent cross-contamination of these samples. The following precautions should be taken when trace contaminants are a concern:

- Disposable gloves should be worn each time a different location is sampled.
- When collecting both surface water and sediments, surface water samples should be collected first. This reduces the chance of sediment dispersal into surface water, and the resulting loss of surface water sample integrity.
- Sampling should occur in a progression from the least to the most contaminated area, if this information is known to the sampling team.
- Samplers should use equipment constructed of polytetrafluoroethylene (PTFE), stainless steel, or glass that has been properly pre-cleaned for collection of samples for trace organic and/or inorganic analyses. Equipment constructed of plastic or polyvinyl chloride (PVC) should NOT be used to collect samples for trace organic compound analyses.
- Equipment constructed of stainless steel should **NOT** be used to collect samples for trace metals analysis.

D.4 Sample Compositing

Sample compositing is a site-specific activity that must be conducted according to your Sampling Analysis Plan (SAP). Compositing is typically used for large sites under investigation to improve the precision (i.e., lower the variance) of the estimated average contaminant concentrations. **Samples for VOA analysis should NOT be composited to minimize loss of VOAs.**

Composite samples consist of a series of discrete grab samples that are mixed together to characterize the average composition of a given material. The discrete samples are usually of equal volume, but may be weighted to reflect an increased flow or volume. Regardless, all discrete samples must be collected in an identical manner and the number of grab samples forming a composite should be consistent.

There are several compositing techniques that may be required such as:

- **Flow-proportioned** – Collected proportional to the flow rate during the compositing period by either a time-varying/constant volume or a time-constant/varying volume method. This technique is usually associated with wastewater or storm water runoff sampling.
- **Time** – Composed of a varying number of discrete samples collected at equal time intervals during the compositing period. This technique is typically used to sample wastewater and streams, and in some air sampling applications.
- **Areal** – Collected from individual grab samples collected in an area or on a cross-sectional basis. Areal composites are comprised of equal volumes of grab samples where all grabs are collected in an identical manner. This technique is typically used for estimating average contaminant concentrations in soils or sediments. This technique is useful when contaminants are present in nugget form (i.e., TNT chunks, lead shot, etc.), thus exhibiting large differences in concentration over a small sample area.
- **Vertical** – Collected from individual grab samples but taken from a vertical cross section. Vertical composites are comprised of equal volumes of grab samples where all grab samples are collected in an identical manner. Examples would include vertical profiles of a soil borehole or sediment columns.
- **Volume** – Collected from discrete samples whose aliquot volumes are proportional to the

volume of sampled material. Volume composites are usually associated with hazardous waste bulking operations where the sample represents combined or bulked waste.

When compositing solid samples (i.e., sediment, soil, or sludge) for analysis of compounds present in trace quantities, a stainless steel or PTFE bowl and spatula should be used.

D.5 Sample Mixing and Homogenizing

Mixing of the sample for the remaining parameters is necessary to create a representative sample media. It is extremely important that solid samples be mixed as thoroughly as possible to ensure that the sample is as representative as possible of the sample location. Please refer to the project-specific SAP regarding instructions on removal of any extraneous materials (e.g., leaves, sticks, rocks, etc.). The mixing technique will depend on the physical characteristics of the solid material (e.g., particle size, moisture content, etc.). The mixing container should be large enough to hold the sample volume and accommodate the procedures without spilling. Both the mixing container (generally a bowl or tray) and the mixing implement should be properly decontaminated before use. Samples should be homogenized according to procedures listed in the project-specific SAP.

Samples for VOA analysis should not be mixed to minimize loss of volatile analytes.

Table D-1 provides a short procedure for mixing a soil sample with a small particle size (less than ¼ in) and filling sample containers in the field.

Table D-1. Mixing a Sample and Filling Sample Containers

Step	Action
1	Roll the contents of the compositing container to the middle of the container and mix.
2	Quarter the sample and move to the sides of the container.
3	Mix each quarter individually, then combine and mix OPPOSITE quarters, then roll to the middle of the container.
4	Mix the sample once more, then quarter the sample again.
5	Mix each quarter individually, then combine and mix ADJACENT corners, then roll to the middle of the container. The goal is to achieve a consistent physical appearance before sample containers are filled.
6	Flatten piled material into an oblong shape.
7	Using a flat-bottomed scoop, collect a strip of soil across the entire width of the short axis and place it into a sample container.
8	Repeat Step 8 at evenly-spaced intervals until the sample containers are filled.
9	Record the approximate quantity of each subsample in the field log book.

Appendix E: Sampling Checklists

Appendix E-1: Personnel Preparation Checklist (Page 1 of 2)

Personnel Briefing	Yes	No	Comments:
1. Did you review sampling team responsibilities and identify individual(s) responsible for corrective actions?			
2. Did you ensure that you have met the appropriate personal safety and protection requirements?			
3. Did you identify sampling locations and receive permission to access them, as appropriate?			
4. Did you contact the appropriate utility companies PRIOR to the start of sampling? **Note:** By law, utility companies must be contacted prior to the start of digging/sampling so that any underground utilities (gas lines, water lines, electrical lines, etc.) can be marked. A list of one-call centers for each state may be found at http://www.digsafe.com/company_onecalldirectory.htm.			
5. If sampling on private property, do you have sample receipts to provide to the property owner for all samples taken and removed from the property?			
6. Have you determined the number and type of samples to be collected?			
7. Did you review sample collection methods?			
8. Have you reviewed sample container requirements?			
9. Did you review decontamination requirements, procedures, and locations?			
10. Did you determine holding times and conditions?			
11. Did you determine Performance Evaluation (PE) and Quality Control (QC) sample requirements?			
12. Have you obtained shipping cooler temperature blanks, if required?			
13. Did you review sample label and tag requirements?			
14. Did you review Traffic Report/Chain of Custody (TR/COC) Record and custody seal requirements?			

Appendix E-1: Personnel Preparation Checklist (Page 2 of 2)

Personnel Briefing (Con't)	Yes	No	Comments:
15. Have you obtained the laboratory name, shipping addresses, and telephone number?			
16. Did you review cooler return instructions?			
17. Have you obtained shipping company information (name, telephone number, account number, pickup schedule)?			
18. Have you obtained shipping schedules?			
19. Did you review shipment reporting requirements and the appropriate contact names and telephone numbers for reporting?			
20. Have you included any sampler comments regarding sampling issues (e.g., low volumes, matrix, suspected concentrations based on field measurements)?			

Appendix E-2: General Sample Collection Checklist (Page 1 of 1)

General Sample Collection	Yes	No	Comments:
1. Did you identify and mark the sampling location with buoys, flags, or stakes according to the sampling plans, maps, and grids?			
2. If the sampling location is inaccessible, did you contact the appropriate field or Regional personnel for instructions?			
3. Did you use the correct sampling equipment?			
4. Did you follow the correct decontamination procedures?			
5. Did you follow the correct collection procedures?			
6. Did you use the correct sample containers for each sample collected?			
7. Did you collect the correct volume for each sample?			
8. Did you collect the correct type of sample, including primary samples and Quality Control (QC) samples?			
9. Did you properly preserve each sample collected?			
10. Did you correctly document and label each sample with all necessary information? **Note: Under no circumstances should the site name appear on any documentation being sent to the laboratory**.			
11. If sampling on private property, did you provide a sample receipt to the owner of the property for all samples taken and removed from the property?			

Appendix E-3: Completing Field Logbook Checklist (Page 1 of 1)

Completing Field Logbook	Yes	No	Comments:
1. Did you use waterproof ink when writing in the field logbook?			
2. Did you document sampling project information such as: • Project name, ID, and location; • Names of sampling personnel; • Geological observations, including maps; • Atmospheric conditions; • Field measurements; and • Sampling dates, times, and locations? **Note: Under no circumstances should the site name appear on any documentation being sent to the laboratory**.			
3. Did you record sampling activity information such as: • Sampling dates and times; • Sample identifications; • Sample matrices; • Sample descriptions (e.g., odors and/or colors); • Number of samples taken; • Sampling methods/equipment; and • Description of QC samples?			
4. Did you document any and all deviations from the sampling plan?			
5. Did you document any and all difficulties in sampling and/or any unusual circumstances?			
6. Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			

Appendix E-4: Completing Handwritten Sample Labels Checklist (Page 1 of 2)

Completing Handwritten Sample Labels	Yes	No	Comments:
1. Did the Region provide CLP Sample Numbers and SMO-assigned Case Numbers?			
2. If additional CLP Sample Numbers were needed, did you contact the appropriate Regional personnel?			
3. Were the CLP Sample Numbers and SMO-assigned Case Numbers on the labels correct? Organic CLP Sample Numbers begin with the Regional letter code, followed by letters and numbers. Inorganic CLP Sample Numbers begin with "M", followed by the Regional letter code, and then letters and numbers. **Note:** The following characters are not used in generating CLP Sample Numbers and should never appear on any paperwork send to the laboratory: I; O; U; and V. Also, the last character of a CLP Sample Number will never be a letter.			
4. Were samples uniquely numbered and designated to only one sample? **Note:** Samples collected for total metal and dissolved metal analyses must receive separate, unique, CLP Sample Numbers.			
5. Were Quality Control (QC) samples numbered accordingly?			
6. Were the specific requirements followed for total and dissolved metals analysis, QC and Performance Evaluation (PE) samples, and SW-846 Method 5035A?			
7. Were all temperature blanks labeled with "TEMPERATURE BLANK"?			
8. Was a sample labels containing the CLP Sample Number, SMO-assigned Case Number, location, concentration, preservative, and the fraction/analysis, attached to each sample bottle or container as the sample was collected? **Note:** **Under no circumstances should the site name appear on any documentation being sent to the laboratory**.			

Appendix E-4: Completing Handwritten Sample Labels Checklist (Page 2 of 2)

Completing Handwritten Sample Labels (Con't)	Yes	No	Comments:
9. Was clear tape placed over the sample labels to protect the labels from moisture and to help the labels adhere to the sample bottle?			
10. Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			

Appendix E-5: Completing Handwritten Sample Tags & Custody Seals Checklists (Page 1 of 2)

Completing Handwritten Sample Tags	Yes	No	Comments:
1. Was waterproof ink used on the sample tags?			
2. If Regionally required for individual sample containers, was the project code on the sample tag completed?			
3. Was the station number on the sample tag completed?			
4 Was the date filled in using the format MM/DD/YYYY?			
5. Was the time of sample collection indicated?			
6. Was the box checked indicating composite or grab sample?			
7. Was the station location on the sample tag completed?			
8. Did you indicate whether or not the sample was preserved by checking "yes" or "no?"			
9. Was the appropriate analysis indicated on the sample tag?			
10. Were the appropriate CLP Sample Number and SMO-assigned Case Number indicated and cross-referenced with the numbers on the sample label?			
11. Did you sign the sample tags?			
12. Did you attach the sample tag to the neck of the sample bottle with string, stretch string, or wire (recommended method)? **Note:** Do **NOT** use wire to attach a sample tag to a metal sample.			
13. Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			
Completing Custody Seals	**Yes**	**No**	**Comments:**
1. Did you sign and date the custody seal?			
2. Did you attach a completed custody seal to the sample bottle, container, or plastic bag, placing the seal over the cap or lid of each sample bottle or container or on the bag opening such that it will be broken if the sample bottle, container, or bag is opened or tampered with?			

Appendix E-5: Completing Handwritten Sample Tag & Custody Seal Checklists (Page 2 of 2)

Completing Custody Seals (Con't)	Yes	No	Comments:
3. As appropriate, did you attach the completed custody seal to the sample shipping container or cooler, placing the seal such that it will be broken if the container or cooler is opened or tampered with?			
4. Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			

Appendix E-6: Packing Shipping Container Checklist (Page 1 of 2)

Packing Shipping Container	Yes	No	Comments:
1. Were you shipping samples in a clean waterproof metal or hard plastic ice chest or cooler in good condition?			
2. Were all inapplicable labels removed from previous shipments?			
3. Were all inside and outside drain plugs closed and covered with suitable tape (e.g., duct tape)?			
4. Was the inside of the cooler lined with plastic (e.g., large heavy-duty garbage bag)?			
5. Was the lined shipping cooler packed with noncombustible absorbent packing material such as rock wool, ground corn cobs, perlite, or a clay-based absorbent (e.g., kitty litter or 'oil dry')?			
6. Were sample containers placed in the cooler in an upright position not touching one another?			
7. Was a sample shipping cooler temperature blank included in the cooler?			
8. Was there sufficient packing material around and in between the sample bottles and cans to avoid breakage during transport?			
9. If required, was double-bagged ice placed on top and around sample bottles to keep the samples cold 4° (± 2°C)? **Note: Do Not Pack Loose Ice Into the Cooler!**			
10. Was the top of the plastic liner fastened and secured with tape?			
11. Was a completed custody seal placed around the top of the fastened plastic liner (if required by the Region)?			
12. Were all sample documents enclosed within the cooler (e.g., TR/COC Record and cooler return instructions) in a waterproof plastic bag?			
13. Did the documentation in the cooler only address the samples in that cooler?			

Appendix E-6: Packing Shipping Container Checklist (Page 2 of 2)

Packing Shipping Container (Con't)	Yes	No	Comments:
14. Was the site name absent from all documentation? **Note: Under no circumstances should the site name appear on any documentation being sent to the laboratory**.			
15. Was the plastic bag, containing the documentation, taped to the underside of the cooler lid?			
16. Were cooler return instructions and airbills, if required, taped to the underside of the cooler lid?			
17. Was the return address of the cooler written with permanent ink on the underside of the cooler lid?			
18. Was tape placed around the outside of the entire cooler with tape over the hinges?			
19. Were the completed custody seals placed over the top edge of the cooler so the cooler cannot be opened without breaking the seals?			
20. Was the return address label attached to the top left corner of the cooler lid?			
21. Were instructional labels attached to the top of the cooler, as necessary (e.g., "This End Up," "Do Not Tamper With," or "Environmental Laboratory Samples")?			
22. If shipping hazardous samples, were the correct labels attached to the cooler (e.g., "Flammable Liquids", "Caution", or "Poison")?			
23. If shipping samples containing Methanol as a preservative (e.g., samples to be analyzed by SW-846 Method 5035A), was a label used to indicate Methanol, the United Nations (UN) identification number for Methanol (UN 1230), and Limited Quantity?			

Appendix E-7: Packing Sample Container Checklist (Page 1 of 1)

Packing Sample Container	Yes	No	Comments:
1. Did you follow all State, Federal, Department of Transportation (DOT), and International Air Transportation Association (IATA) regulations governing the packaging of environmental and hazardous samples? **Note:** If samples contain methanol preservation (e.g., samples to be analyzed by SW-846 Method 5035A), refer to the packaging instructions in Appendix A.			
2. Were all CLP Sample Numbers, SMO-assigned Case Numbers, fractions/analyses, labels, tags, and custody seals attached to the correct sample containers?			
3. Was an inventory conducted of CLP Sample Numbers, SMO-assigned Case Numbers, fractions/analyses, and containers, and verified against the TR/COC Records?			
4. Were the correct number and type of Performance Evaluation (PE) and Quality Control (QC) samples collected?			
5. Were all sample containers sealed in clear plastic bags with the sample label and tag visible through the packaging?			
6. Were all soil/sediment samples known to contain dioxin securely enclosed in metal cans (e.g., paint cans) with the lids sealed?			
7. Was suitable absorbent packing material placed around the sample bottles or containers?			
8. Were the outsides of metal containers labeled properly with the CLP Sample Number, SMO-assigned Case Number, and the fraction/analysis of the sample inside?			

Appendix E-8: Shipping & Reporting CLP Samples Checklists (Page 1 of 2)

Shipping CLP Samples	Yes	No	Comments:
1. Did you follow all State, Federal, Department of Transportation (DOT), and International Air Transportation Association (IATA) regulations governing the shipment of environmental and hazardous samples?			
2. Was a separate airbill filled out for each cooler being shipped?			
3. Was the airbill filled out completely, including correct laboratory name, address, and telephone number, identification of recipient as "Sample Custodian," and appropriate delivery option (e.g., overnight or Saturday)?			
4. Was the completed airbill attached to the top of the cooler with the correct laboratory address?			
5. If more than one cooler was being shipped to the same laboratory, were they marked as "1 of 2," "2 of 2," etc.?			
6. Were the samples being shipped "overnight" through a qualified commercial carrier (e.g., FedEx, UPS, Purolator, or Airborne Express)?			
Reporting CLP Samples	**Yes**	**No**	**Comments:**
1. Did you contact the Contract Laboratory Program Sample Management Office (CLP SMO) on the same day samples were shipped?			
2. If the samples were shipped after 5:00 PM Eastern Time (ET), were they reported to the RSCC Coordinator (or their designee) or to CLP SMO by 8:00 AM ET the following business day?			
3. Did you notify the RSCC Coordinator (or their designee) or CLP SMO by 3:00 PM ET on Friday for sample shipments that will be delivered to the laboratory on Saturday?			

Appendix E-8: Shipping & Reporting CLP Samples Checklists (Page 2 of 2)

Reporting CLP Samples (Con't)	Yes	No	Comments:
4. Did you provide the RSCC Coordinator (or their designee) or CLP SMO with: • Your name, phone number, and Region number; • Case Number of the project; • Exact number of samples, matrix(ces), concentration(s), and type of analysis; • Laboratory(ies) to which the samples were shipped; • Carrier name and airbill number; • Date of shipment; • Date of next shipment; and • Any other information pertinent to the shipment?			

Appendix F: Glossary

Analyte -- The element, compound, or ion an analysis seeks to determine; the element of interest.

ASB (Analytical Services Branch) -- Directs the Contract Laboratory Program (CLP) from within the United States Environmental Protection Agency's (USEPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) in the Office of Solid Waste and Emergency Response (OSWER).

Case -- A finite, usually predetermined, number of samples collected over a given time period from a particular site. Case Numbers are assigned by the Sample Management Office (SMO). A Case consists of one or more Sample Delivery Groups (SDGs).

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) -- Initiated in December 1980, CERCLA provided broad federal authority to respond directly to the release or possible release or hazardous substances that may endanger human health or the environment. CERCLA also established a trust fund to provide for cleanup when no responsible party could be identified, hence CERCLA is commonly referred to as "Superfund".

Contract Laboratory Program (CLP) -- A national program of commercial laboratories under contract to support the USEPA's nationwide efforts to clean up designated hazardous waste sites by providing a range of chemical analytical services to produce environmental data of known and documented quality. This program is directed by USEPA's Analytical Services Branch (ASB).

Contract Laboratory Program Project Officer (CLP PO) -- Monitors technical performance of the contract laboratories in each Region.

Contract Laboratory Program Routine Analytical Services (CLP RAS) -- Services provided by the Regional Sample Control Center (RSCC) Coordinator such as the processing of a request for Case Numbers and the scheduling of delivery of those Case Numbers to sampling personnel.

Contract Laboratory Program Sample Management Office (CLP SMO) -- A contractor-operated facility operated under the CLP, awarded and administered by the USEPA. Provides necessary management, operations, and administrative support to the CLP. CLP SMO coordinates and schedules sample analyses, tracks sample shipments and analyses, receives and tracks data for completeness and compliance, and processes laboratory invoices.

Custody Seal -- An adhesive label or tape that is used to seal a sample bottle or container that maintains chain-of-custody and that will break if the sample bottle or container is opened or tampered with.

Cyanide (Total) -- Cyanide ion and complex cyanides converted to hydrocyanic acid (HCN) by reaction in a reflux system of a mineral acid in the presence of magnesium ion.

Data Quality Objective (DQO) -- The requirements established to maintain the quality of the data being collected.

Data Validation -- Data validation is based on Region-defined criteria and limits, professional judgement of the data validator, and (if available) the Quality Assurance Project Plan (QAPP) and Sampling and Analysis Plan (SAP).

Equipment Blank -- A sample used to check field decontamination procedures. See Field Blank.

Field Blank -- Any blank sample that is submitted from the field. Each field blank is assigned its own unique EPA Sample Number. A field blank checks for cross-contamination during sample collection, sample shipment, and in the laboratory. A field blank includes trip blanks, rinsates, equipment blanks, etc.

Field Duplicate -- Checks reproducibility of laboratory and field procedures and indicates non-homogeneity.

Field Operations Reporting Management System (FORMS) II Lite -- A stand-alone, Windows-based software application that enables samplers to automatically create and generate sample documentation both prior to and during a sampling event.

Field QC Sample -- Used to detect for contamination or error in the field.

Field Sample -- Primary sample material taken out in the field from which other samples, such as duplicates or split samples, are derived. A field sample can be prepared in the field and sent for analysis in one or multiple containers, and is identified by a unique EPA Sample Number.

Field Sampling Plan (FSP) -- Developed to outline the actual steps and requirements pertaining to a particular sampling event. Explains, in detail, each component of the event to all involved sampling personnel.

Holding Time -- The elapsed time expressed in hours, days, or months from the date of receipt of the sample by the laboratory until the date of its analysis.

> **Contractual** -- The lengths of time that the Contract Laboratory Program (CLP) laboratory must follow to comply with the terms of the contract, and are described in the CLP analytical services Statements of Work (SOWs). They are the shorter than technical holding times to allow for sample packaging and shipping.
>
> **Technical** -- The maximum lengths of time that samples may be held from time of collection to time of preparation and/or analysis and still be considered valid.

Laboratory Blank -- See Method Blank.

Laboratory Duplicate -- A sample required by the laboratory's contract to check the precision of inorganic analyses.

Laboratory QC Sample -- An additional volume of an existing sample, as required by the laboratory's contract, used to detect contamination or error in the laboratory's practices.

Matrix -- The predominant material of which a sample to be analyzed is composed.

Matrix Spike (MS) -- Sample required by the laboratory's contract to check the accuracy of organic and inorganic analyses. It is an aliquot of a sample (water or soil) that is fortified (spiked) with known

quantities of a specific compound and subjected to the entire analytical procedure. Also see Matrix Spike Duplicate.

Matrix Spike Duplicate (MSD) -- Sample required by the laboratory's contract to check the accuracy and precision of organic analyses. It is a second aliquot of the same matrix as the Matrix Spike (MS) that is spiked to determine the precision of the method. Also see Matrix Spike.

Method Blank -- An analytical control consisting of all reagents, internal standards and surrogate standards [or System Monitoring Compounds (SMCs) for volatile organic analysis], that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background, and reagent contamination. Also referred to as laboratory blank when defining the level of laboratory contamination. Also see Laboratory Blank.

Performance Evaluation (PE) Sample -- A sample of known composition provided by the United States Environmental Protection Agency (USEPA) for contractor analysis. Used by USEPA to evaluate contractor performance.

Pesticides -- Substances intended to repel, kill, or control any species designated a "pest", including weeds, insects, rodents, fungi, bacteria, and other organisms. Under the Contract Laboratory Program (CLP), only organochlorine pesticides are analyzed (e.g., DDT, Dieldrin, Endrin, etc.).

Polychlorinated Biphenyls (PCBs) -- A group of toxic, persistent chemicals used in electrical transformers and capacitors for insulating purposes, and in gas pipeline systems as a lubricant. The sale and new use of PCBs were banned by law in 1979.

Quality Assurance (QA) -- An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer.

Quality Assurance Project Plan (QAPP) -- Document written to meet requirements outlined in the document *EPA Guidance for Quality Assurance Project Plans* (EPA QA/R-5). Prepared in advance of field activities and used by sampling personnel to develop any subsequent plans such as the Sampling Analysis Plan (SAP) or the Field Sampling Plan (FSP).

Quality Control (QC) -- The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality.

Regional Sample Control Center (RSCC) Coordinator -- In most Regions, coordinates sampling efforts and serves as the central point-of-contact for sampling questions and problems. Also assists in coordinating the level of Regional sampling activities to correspond with the monthly projected demand for analytical services.

Regional Site Manager -- Coordinates the development of data quality objectives and oversees project-specific remedial or removal contractors, State officials, or private parties conducting site sampling efforts.

Rinse Blank -- A sample used to check decontamination procedures. Also see Field Blank.

Routine Analytical Service (RAS) -- The standard inorganic, organic, and organic low concentration high volume, multi-component analyses available through the Contract Laboratory Program (CLP).

Sample -- A single, discrete portion of material to be analyzed, which is contained in single or multiple containers and identified by a unique Sample Number.

Sample Delivery Group (SDG) -- An *organic* SDG is a group of 20 or fewer field samples within a Case [excluding Performance Evaluation (PE) samples] received over each 7-calendar day period. An *inorganic* SDG is a group of 20 or fewer field samples (excluding PE samples) received over a 7-calendar-day period (3-calendar-day period for 7-day turnaround) during which all field samples in a case are received (said period beginning with the receipt of the first sample in the SDG). An SDG is defined by one of the following, whichever occurs first:

- Each Case of field samples received; or
- Each 20 field samples (excluding PE samples) within a Case; or
- Each 7 calendar day period (3 calendar day period for 7-day turnaround) during which field samples in a Case are received (said period beginning with the receipt of the first sample in the SDG) [applies to inorganics only].

Sample Label -- An identification label attached to a sample bottle or container to identify the sample.

Sample Number -- A unique number used to identify and track a sample. This number can be recorded on a sample label or written on the sample bottle or container using indelible ink.

Sample Tag -- A tag attached to a sample that identifies the sample and maintains chain-of-custody.

Sampling Analysis Plan (SAP) -- A document that explains how samples are to be collected and analyzed for a particular sampling event.

Semi-Volatile Organic Analyte (SVOA) -- A compound amenable to analysis by extraction of the sample using an organic solvent.

Statement of Work (SOW) -- A document that specifies how laboratories analyze samples under a particular Contract Laboratory Program (CLP) analytical program.

Superfund -- The program operated under the legislative authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA) that funds and carries out USEPA removal and remedial activities at hazardous waste sites. These activities include establishing the National Priorities List (NPL), investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising cleanup and other remedial actions.

Superfund Amendments and Reauthorization Act (SARA) -- The 1986 amendment to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) .

Traffic Report/Chain of Custody (TR/COC) Record -- A record that is functionally similar to a packing slip that accompanies a shipment of goods. Used as physical evidence of sample custody and functions as a permanent record for each sample collected.

Trip Blank -- A sample used to check for contamination during sample handling and shipment from field to laboratory. Also see Field Blank.

Volatile Organic Analyte (VOA) -- A compound amenable to analysis by the purge-and-trap technique. Used synonymously with the term purgeable compound.